Impact Papers: Requirements, Issues, Concepts

A Brainstorming Session

April 21, 1999

STEP Modularization PWI London Workshop

Requested Impact Papers

- **6/99 Impact paper Integrated and Common Resources**
- **6/99 Impact paper Implementation Methods**
- **6/99 Impact paper EXPRESS-X**
- **6/99 Impact paper EXPRESS-2**
- **6/99 Impact paper WG10 Data Architecture PWI**
- **6/99 Impact paper on Vendors**
  - **Some input from PDES, Inc. STEPnet vendors based on 2 hour workshop last September**
- **6/99 Impact paper on Users**

Impact Papers: Requirements, Issues, Concepts

- **The PWI has a set of "Impact Papers" as deliverables**
- **To get started - 15 minute brainstorming session on each paper answering the following:**
  - **What is the purpose of each paper?**
  - **Who is the audience of each paper?**
  - **What key requirements, issues, concepts should be addressed?**

Proposed Table of Contents

- **The Impact of STEP Modularization on <Users>**
  - **1 Introduction**
  - **2 Today's <User> View of STEP**
    - **it may be hard to do this, many perspectives from any group of people**
  - **3 Modularization from a <User> Perspective**
  - **4 The Impact on <Users>**
  - **5 Conclusions**

Impact on Integrated and Common Resources

- **Purpose**
  - **?**
- **Audience**
  - **STEP WGs, JWG9**
- **Key requirements, issues, concepts**
  - **Some modules will be "common resources"**
  - **at some point modules will interpret from CRs that are not IRs**
  - **example of CR is Plib expression schema which may be a good example of an ARM-less module**
  - **modularization at the ARM level identifies potential problem areas in the dependencies between some IR constructs**
  - **changes to EXPRESS to support modularization may drive changes to IRs**
    - **is this the time to address "workarounds" in the 2nd editions?**
      - **May be a dependency on EXP-X to specify mapping from 2nd ed to 3rd**
    - **Can fix problems that resulted from not having extensible select types and separate supertype constraints when the IRs were orignially developed**
  - **new CR/sIRs could take modular requirements and perhaps EXP 1.1 into account**

Impact on Implementation Methods

- **Purpose**
  - **?**
- **Audience**
  - **?**
- **Key requirements, issues, concepts**
  - **expected to help toolkit work at a level higher than the AIM, smaller granularity of data exchange based on modules**
  - **these will require a structural (ie. not necessarily semantic) meta-model for E1.1, E2 and EX that is shared and useful for SDAI and other implementation methods**
  - **implementation methods may need to understand modular concepts perhaps in addition to EXPRESS constructs (UoF for example)**

Impact on EXPRESS-X

- **Purpose**
  - **?**
- **Audience**
  - **?**
- **Key requirements, issues, concepts**
  - **expected to help toolkit work at a level higher than the AIM, capable of replacing mapping table**
  - **expect to be able to specify the mapping from existing schemas to modules schemas in the case where harmonization causes changes to schemas or interpretations**
  - **may need to represent ARM constraints in EXP-X to really replace the mapping tables (e.g. rules column in mapping table)**
  - **idea of mapping macros may be new requirements on EXPRESS-X**
  - **may want to use EXP-X as only place to create constraints thus basing exchange on the EXP-X with today's AIM providing only structure**
    - **issue was raised that this may add complexity that file exchange STEP usages do not require or which may confuse them even more (it may be preferable to keep the AIM constraints separate from the view used to try and describe the requirements in the ARM)**

Impact on EXPRESS-2

- **Purpose**
  - **?**
- **Audience**
  - **?**
- **Key requirements, issues, concepts**
  - **see next slide!**
  - **need to turn off global rules sometimes or have them applicable only**
  - **connotational subtype/E-X view are quite similar and could be included in E-1.1**
  - **Good agreement at workshop that EXPRESS 1.1 is something that WG10 should request… This PWI will attend the EXPRESS committee at Lillehammer and raise this issue**

Impact on EXPRESS-2 (2)

- **Issues**
  - **It is becoming more and more clear that extensible SELECT types are critical to modules development**
  - **Modules need to declare limited rules for maximum reuse so we need SUPERTYPE constraint separated from the supertype ENTITY declaration**
  - **The capability specified in EXPRESS-2 seems to (almost) meet the requirements**
  - **EXPRESS-2 is years away from standardization**

Impact on EXPRESS-2 (2)

- **Proposal for Modularization PWI resolution:**
  - **WG10 AP Interoperability and STEP Modularization has provided requirements to WG11 which they have addressed!**
    - **Unfortunately, this is tied to EXPRESS-2 and all that comes with it - dynamics**
  - **WG10 requests WG11 to start a Part 11 Amendment NWI to address these well defined, well satisfied and critical requirements:**
    - **Extensible SELECT types**
      - **including empty extensible SELECT types, not in E2 yet**
    - **SUPERTYPE constraint separated from ENTITY declaration**
    - **E1.1 upwardly compatible with EXPRESS-2**

8.4.2 Select data type

- **An extensible type may be specified using the extensible keyword, in which case the domain is the union of the named data types in its select list and also those in every extension of that data type.**
- **This signifies that the list of data type selected from may be extended in other extended types, it also signifies that wherever the extensible select type is used a valid extension of that type is compatible, i.e., the extensible select data type is a generalisation of all extensions of that type in the current schema context.**
- **The extension of a extensible select data type is specified using the based on keyword.**
- **The domain of values for an extension is the select list of the extension, and those select list items explicitly named in the extensible select on which this extension is based.**
- **A select data type may be constrained to have only entity instances in its domain by using the keyword instance . In this case all select elements must either be entity data types or select data types whose select list only includes entity data types. If an extensible select data type is constrained to be an instance select, then all extensions of that select shall be instance selects, and need to specify the INSTANCE keyword.**

Syntax

select_type IS [EXTENSIBLE] [INSTANCE] SELECT (select_list | select_extension)

select_extension IS BASEDON type_ref WITH select_list

EXAMPLE:

```
SCHEMA a;
(* In the scope of a you can approve product *)
TYPE approvable_item IS EXTENSIBLE SELECT (product);
ENTITY approval; items : SET OF approvable_item; END_ENTITY;
END_SCHEMA;

SCHEMA b;
(* In the scope of b you can approve product or pdf *)
USE FROM a;
TYPE add_pdf IS SELECT BASEDON approvable_item WITH
   (product_definition_formation);
END_SCHEMA;
```

Separating subtype constraint from entity declaration

```
ENTITY class;
 name : class_name;
END_ENTITY;
ENTITY class_of_facility SUBTYPE OF (class);
END_ENTITY;
ENTITY class_of_organisation
SUBTYPE OF (class);
END_ENTITY;
SUBTYPE_CONSTRAINT independent_classification FOR
  class;
ABSTRACT SUPERTYPE;
ONEOF(class_of_facility, class_of_organisation);
END_SUBTYPE_CONSTRAINT;
```

Impact on WG10 Data Integration Architecture

- **Purpose**
  - **?**
- **Audience**
  - **?**
- **Key requirements, issues, concepts**
  - **Bill says the IRs are actually a "Product ontology representation schema". ARM is a user ontology for a particular application. Modularization/harmonization is trying to create a single (or at least fewer) of these user ontologies.**
    - **Ontology = context + semantics**
    - **Capturing the context as well as the semantics is important in order to cover the STEP requirements. The AAM may help provide some of this context.**
  - **We would like to come back to this on Friday.**

Impact on Vendors

- **Purpose**
  - **?**
- **Audience**
  - **?**
- **Key requirements, issues, concepts**
  - **should help them take up STEP more quickly, may be able to provide GUI based on modules/UoF, may make STEP development something a vendor or group of vendors can afford, could allow toolkits at a higher level than just EXPRESS/SDAI/P21 to modules, toolkits that work higher than at the AIM level**
  - **users may put requirements on vendors to support more capabilities (eg P21 extension and SDAI cross-schema reference) than they do now with single AP, long form schema implementations**

Impact on Users

- **Purpose**
  - **?**
- **Audience**
  - **1 production users, 2 high visibility pilots but not products in-work standards, 3 heard of STEP but done something else, 4 just waiting**
- **Key requirements, issues, concepts**
  - **1 extending capability, 2 reuse what 1 has done at the level of the standard and implementation, 3/4 increased speed of delivery of capability, smaller more manageable development, 1 perhaps ability to configure implementations by users based on UoF/modules breakdown outside the AP/CC framework, clearer distinction between data scope and activity scope**
  - **there are some advanced capabilities in implementation methods that users could take advantage of in a modular architecture (based on Aps and industry agreements). For example, managing data at module/UoF level rather than at an AP level**